

Appin. No. 10/034,502
Docket No. 14XZ00124/GHM-0203

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) A method of automatic detection of a graduated compression paddle used for breast analysis in digital mammography, the method comprising the steps of:

acquiring a base digital image containing the paddle and at least a portion of the breast, the base image being subdivided into rows of N elementary pixels respectively assigned luminous intensity values, the rows of elementary pixels all being parallel to a general direction of graduation of the paddle;

determining N autocorrelations of the vector of luminous intensity values associated with the row of elementary pixels are made for each row, with respectively the vector and the N-1 vectors successively shifted by 1 elementary pixel, so as to obtain for each row a vector of N autocorrelation values;

carrying out a Fourier transform treatment on each autocorrelation vector, in order to obtain an energy frequency spectrum;

comparing the energy value at the frequency of the graduated marks for each spectrum with a predetermined threshold value; ~~and~~

detecting the paddle; and

unambiguously distinguishing a densest area of the breast from an area of the paddle containing the graduated marks, thereby enabling automatic exposure adjustment based on a most glandular area of the breast;

wherein the acquisition of the image is carried out in an automatic mode, in which an adjustment of the exposure parameters is determined from a table of automatic optimization of parameters (AOP).

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2. (original) The method according to claim 1 wherein the base image is subdivided into rows of N cells of $n \times n$ base pixels and each cell is transformed into an elementary pixel, the luminous intensity value of the elementary pixel being equal to the mean of the luminous intensity values respectively associated with the base pixels of the cell.

3-5. (canceled)

6. (currently amended) A device for automatic detection of a graduated compression paddle used for breast analysis in digital mammography, the device comprising:

means for acquisition of a digital base image containing the paddle and at least a portion of the breast;

means for subdivision of the base image into rows of N elementary pixels respectively assigned luminous intensity values, the rows of elementary pixels all being parallel to a general direction of graduation of the paddle;

means capable of carrying out for each row N autocorrelations of the vector of luminous intensity values associated with the row of elementary pixels, with respectively the vector and the N-1 vectors successively shifted by 1 elementary pixel, so as to obtain for each row a vector of N autocorrelation values;

means for treatment capable of carrying out a Fourier transform treatment on each autocorrelation vector, so as to obtain an energy frequency spectrum;

means for comparison capable of comparing the energy value at the frequency of the graduated marks with a predetermined threshold value for each spectrum; and

means for detection capable of deducing the presence of the paddle from the result of the comparison, and unambiguously distinguishing a densest area of the breast from an area of the paddle containing the graduated marks, thereby enabling automatic exposure adjustment based on a most glandular area of the breast.

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7. (original) The device according to claim 6 wherein the means for subdivision are capable of subdividing the base image into rows of N cells of $n \times n$ base pixels, and contain means for transformation capable of transforming each cell into an elementary pixel, the luminous intensity value of the elementary pixel being equal to the mean of the luminous intensity values respectively associated with the base pixels of the cell.

8. (original) A device for automatic detection of a graduated compression capable of applying the method according to claim 1.

9. (original) Computer program product, recorded on a support usable in a processor, containing program code means employing the method according to claim 1 when the product is executed within the processor.

10. (new) The method according to claim 1, wherein the comparing the energy value at the frequency of the graduated marks comprises:
comparing the energy value at the spacing frequency of the graduated marks.

11. (new) The device according to claim 6, wherein the means for comparison capable of comparing the energy value at the frequency of the graduated marks with a predetermined threshold value for each spectrum comprises:
means for comparison capable of comparing the energy value at the spacing frequency of the graduated marks with a predetermined threshold value for each spectrum.

12. (new) A method of automatic detection of a graduated compression paddle used for organ analysis in digital mammography, the method comprising:

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acquiring a base digital image containing the paddle and at least a portion of the organ, the base image being subdivided into rows of N elementary pixels respectively assigned luminous intensity values, the rows of elementary pixels all being parallel to a general direction of graduation of the paddle;

determining N autocorrelations of the vector of luminous intensity values associated with the row of elementary pixels are made for each row, with respectively the vector and the $N-1$ vectors successively shifted by 1 elementary pixel, so as to obtain for each row a vector of N autocorrelation values;

carrying out a Fourier transform treatment on each autocorrelation vector, in order to obtain an energy frequency spectrum;

comparing the energy value at the spacing frequency of the graduated marks for each spectrum with a predetermined threshold value;

detecting the paddle; and

unambiguously distinguishing a densest area of the organ from an area of the paddle containing the graduated marks, thereby enabling automatic exposure adjustment based on a most glandular area of the organ.